Scientific Inquiry

5-1 The student will demonstrate an understanding of scientific inquiry, including the foundations of technological design and the processes, skills, and mathematical thinking necessary to conduct a controlled scientific investigation.

5-1.7 Use a simple technological design process to develop a solution or a product, communicating the design by using descriptions, models, and drawings.
Taxonomy Level:

Previous/Future knowledge: This is the first time that the technological design process has been introduced. In 6th grade (6-1.4), students will use a technological design process to plan and produce a solution to a problem or a product (including identifying a problem, designing a solution or a product, implementing the design, and evaluating the solution or the product). In high school Physical Science (PS-1.8), students will compare the processes of scientific investigation and technological design.

It is essential for students to know that *technology* is any tool or process designed to help society in some way. Technology applies scientific knowledge in order to develop a solution to a problem or create a product to help meet human needs. Technology is usually developed because there is a need or a problem that needs to be solved. *Technological design* is the process of using scientific knowledge and processes to develop technology (such as solutions to a problem or a new or improved product). Steps in the technological design process include:

- *Identifying a problem or need*
  - Research and gather information on what is already known about the problem or need
- *Designing a solution or a product*
  - Generate ideas on possible solutions or products
- *Implementing the design*
  - Build and test a solution or a product
- *Evaluating the solution or the product*
  - Determine if the solution or product solved the problem

The steps of the design can be communicated using descriptions, models, and drawings.

- A *scientific model* is an idea that allows us to create explanations of how the something may work. Models can be physical or mental.

NOTE TO TEACHER: Students in 5th grade need to know the steps used in a simple technological design, but do not have to carry out the steps to create the product or solution. However, to conceptualize this process, the implementation of the steps would be helpful.

It is not essential for students to compare the processes of a controlled scientific investigation and the technological design process or evaluate a technological design or product on the basis of designated criteria (including cost, time, and materials).

Assessment Guidelines:
The objective of this indicator is to *use* a simple technological design process to develop a solution or a product, communicating the design by using descriptions, models, and drawings; therefore, the primary focus of assessment should be to apply the procedures for a simple technological design process as listed in the indicator. However, appropriate assessments should also require students to *illustrate* the design process through words, pictures, or diagrams; *summarize* the process of technological design; *identify* the steps of technological design; or *match* a specific solution or product to a specific need or problem.

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